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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

COREPHOTONICS, LTD.,

Plaintiff,

v.

APPLE INC.,

Defendant.

Case No. 5:17-cv-06457-JD (lead case)
Case No. 5:18-cv-02555-JD

APPLE'S RESPONSIVE CLAIM CONSTRUCTION BRIEF

Date: TBD
Time: TBD
Courtroom: 11
Judge: Hon. James Donato

DEMAND FOR JURY TRIAL

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Durand Decl.	Declaration Of Frédo Durand In Support Of Apple Inc.'s Proposed Claim Constructions
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Ex. A	Patent Owner's Preliminary Response to Petition for Inter Partes Review, IPR2018-00549, November 7, 2018 (P.T.A.B.)
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I. THE COURT SHOULD ADOPT APPLE'S PROPOSALS.

A. "Wide" and "Tele" ('291 patent, claims 1, 12)

Term	Corephotonics's Proposal	Apple's Proposal
"Wide"	"Wide" refers to one of a pair of imaging sections with a wider field of view	No construction necessary. If the Court determines that construction is necessary, Apple would propose that "Wide" means "wide-angle," or, alternatively, "wide-angle, characterized by an effective focal length (EFL) shorter than normal and field of view (FOV) wider than normal."
"Tele"	"Tele" refers to one of a pair of imaging sections with a narrower field of view	telephoto, characterized by a TTL/EFL ratio less than 1. Alternatively, in the event the Court does not adopt that construction, Apple would propose that "Tele" means "telephoto, characterized by an effective focal length (EFL) longer than normal and field of view (FOV) narrower than normal."

1. Corephotonics admitted that "Wide" and "Tele" mean "wide-angle" and "telephoto," respectively.

The '291 patent terms "Wide" and "Tele" are shorthand for "wide-angle" and "telephoto," as Corephotonics's original claim construction brief in this case admitted:

> The '291 patent is directed to thin dual-lens digital cameras with optical zoom, which operate in both video and still mode. '291 pat., 3:14-24. The '291 patent generally describes technology that uses image fusion to combine the images from the wide-angle ("Wide") and telephoto ("Tele") cameras for still pictures, but does not use image fusion for video. In particular,

Dkt. 96 at 6 (highlighted).[1] Corephotonics was telling the Court the meaning of "Wide" and "Tele" in this patent, not just describing "commercial embodiments" as it now asserts. Open. Br. at 7.

Corephotonics defined the same meanings at the Patent Office. In response to Apple's IPR petition on the '291 patent, Corephotonics applied the meanings of "Wide" and "Tele" as "wide-angle" and "telephoto," respectively, in attempting to distinguish the prior art. Corephotonics confirmed that "Wide" and "Tele" in the '291 patent simply mean "wide-angle" and "telephoto." *E.g.*, Ex. A at 4-5, 8 ("The '291 patent teaches that in video mode . . . zooming may be performed on ***wide-angle*** images

[1] This opening brief and Apple's original responsive brief were filed and pending before the case was stayed in 2018. After the Court lifted the stay in 2022, Corephotonics proposed to simply move forward with filing its reply brief (Dkt. 123 at 9-10), thus embracing this opening brief, but the Court ended up resetting the *Markman* schedule.

up to a zoom factor at which operation would switch over to the ***telephoto camera***, and vice versa."). Using that meaning, Corephotonics argued that the prior art (Parulski) did not disclose the claim language reciting combining "***Wide and Tele image data*** to provide a fused output image from a particular point of view." *Id*. at 24-26. It argued that "[t]he '291 patent defines point of view (POV)" based on "***the images captured by telephoto and wide-angle cameras***" and argued that Parulski did not disclose "points of view of ***telephoto and wide-angle cameras***" and did not disclose "how ***images from the wide-angle and telephoto camera*** points of view would be fused" to obtain an image from a particular POV. *Id*. Thus, Corephotonics equated "Wide" with "wide-angle" and "Tele" with "telephoto" in its argument to distinguish the art.

"Any explanation, elaboration, or qualification presented by the inventor during patent examination is relevant, for the role of claim construction is to 'capture the scope of the actual invention' that is disclosed, described, and patented." *Iridescent Networks, Inc. v. AT&T Mobility, LLC*, 933 F.3d 1345, 1352 (Fed. Cir. 2019) (citation omitted). Corephotonics cannot now argue that "Tele" and "Wide" mean something different from "telephoto" and "wide-angle." *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1359-64 (Fed. Cir. 2017) (claim construction based on patent owner statements in IPR POPR). Claims may not be "construed one way in order to obtain their allowance and in a different way against accused infringers." *Id.* at 1360 (citation omitted).

It should come as no surprise that Corephotonics admitted, both in this case and before the Patent Office, that "Tele" is telephoto and "Wide" is wide-angle, because that is what the '291 specification teaches. The disclosure borrows the concepts of wide-angle ("Wide") and telephoto ("Tele") sub-cameras from a Kodak patent application ("Border") in which "two sensors are operated simultaneously to capture an image imaged through an associated lens." '291, col. 2:3-14. Border provides a solution where "a ***wide-angle*** camera and a ***telephoto*** camera are affixed together for simultaneous capture of the same scene." Ex. B, ¶ 8.[2] Border discloses using both (1) a "***wide-angle*** lens" with a "***wide-angle*** image sensor" that captures a "***wide*** image," and (2) a "***telephoto*** lens" with a "***telephoto*** second image sensor" that captures a "***telephoto*** image." *Id*., *e.g.*, ¶¶ 30-32, 36, 55, 58,

[2] All emphasis in quoted text is added unless otherwise noted.

64-67, Figs. 1A-1B, 5-6 ("***wide image***" and "***telephoto image***," ¶¶ 21-22, 36, 47). The '291 patent applies the shorthand terms "Wide" and "Tele" to describe these "wide-angle" and "telephoto" features: "One sensor is commonly called 'Wide' and the other 'Tele'. Each sensor provides a separate image, referred to respectively as 'Wide' (or 'W') and 'Tele' (or 'T') images." '291, col. 2:10-14. The patent labels Border's "wide-angle image sensor" and "wide image" with the shorthand "Wide," and its "telephoto image sensor" and "telephoto image" with "Tele." *Id*. Durand Decl., ¶¶ 61-68.

Apple agrees with Corephotonics that the '291 patent uses "Wide" and "Tele" to denote certain components (Open. Br. at 8), based on lens characteristics. The dispute is whether those lens characteristics are wide-angle/telephoto, which is the meaning the patent teaches and Corephotonics previously admitted, or merely relative width of field of view (FOV), which is not accurate.

Corephotonics admits that the meanings of "Wide" and "Tele" derive from "the prior art" as discussed in that passage of the '291 patent. Open. Br. at 4 (quoting '291, col. 2:10-14). But it ignores the context of that discussion, which summarizes and refers to Border's "wide-angle" and "telephoto" features as "Wide" and "Tele," and thereby adopts the terminology of "Wide" as shorthand for wide-angle and "Tele" as shorthand for telephoto. '291, col. 2:3-14. This same passage also refutes Corephotonics's claim that "wide-angle sensor" and "telephoto sensor" are "meaningless" or "absurd" (Open. Br. at 6-7) as it embraces Border's description of a "wide-angle image sensor" and "telephoto . . . sensor." *E.g.*, Ex. B, ¶ 66. Corephotonics posits that a "sensor" cannot have "a particular FOV" (Open. Br. at 6), but its own proposal redefines "Wide sensor" as "*sensor having a FOV wider than the Tele FOV*" and vice-versa for "Tele sensor." Durand Decl., ¶¶ 69-71.

2. "Telephoto" refers to the ratio TTL/EFL<1.0, or TTL smaller than EFL.

In addition to ruling that "Tele" means "telephoto," the Court should also define the meaning of "telephoto" because the parties dispute its meaning. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008); *Eon Corp. IP Holdings LLC v. Silver Spring Networks, Inc.*,815 F.3d 1314, 1318-23 (Fed. Cir. 2016). The term "telephoto" has a well-known meaning to a person of ordinary skill in this field ("POSITA"), and is used consistently in the specification, as a lens whose total track length (TTL) is less than the effective focal length (EFL). Durand Decl., ¶¶ 76-82; '291, col. 3:28-32. TTL and EFL are terms that describe multi-element lenses, both with stipulated

constructions in this case (Dkt. 147 at 1). TTL is the total length from the outward-facing surface of the first lens element to the location that the image is formed, such as an image sensor or film. EFL refers to the focal length of the full lens. By definition, a "telephoto" lens has a TTL smaller than EFL, or stated differently, TTL/EFL<1.0. The textbook images below shows this defining "principle" of the telephoto lens, where the TTL is total length and EFL is focal length.

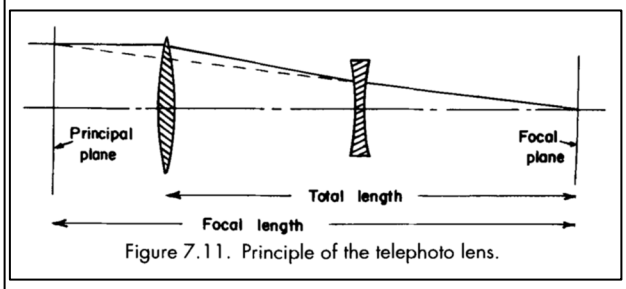


Figure 7.11. Principle of the telephoto lens.

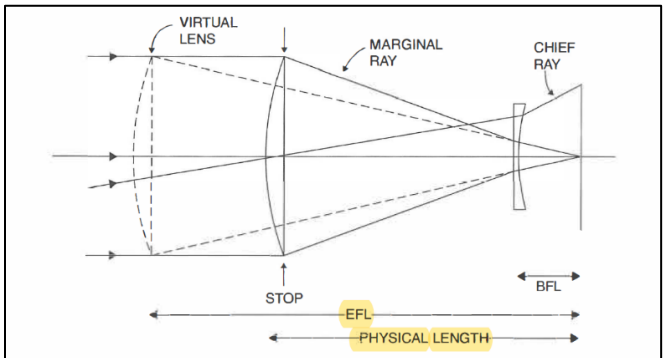


Figure 8.5 Telephoto lens. From *Practical Computer-Aided Lens Design* published by Willmann-Bell, Inc. (www.willbell.com) Used with permission.

Ex. C at 148-149; Ex. H at Fig. 8.5; *see also* Ex. D at § 12.2.2 ("Telephoto Lens . . . The effective focal length of the system is larger than the total length . . ."), Ex. E at 169 (discussing "a compact system with an effective focal length F which is longer than the overall length L of the lens. The ratio of L/F is called the telephoto ratio, and a lens for which this ratio is less than unity is classified as a telephoto lens."), *id*. at Fig. 10.1. *Starhome GmbH v. AT&T Mobility LLC*, 743 F.3d 849, 856 (Fed. Cir. 2014) ("dictionaries and treatises can often be useful in claim construction") (citations omitted).

The '291 patent reflects this well-established meaning. In one embodiment, "the Tele lens TTL/EFL ratio is smaller than 0.9. In other embodiments, the Tele lens TTL/EFL ratio may be smaller than 1." '291, 12:51-53. The specification never discloses a "Tele" lens with a TTL/EFL ratio of 1.0 or more. Durand Decl., ¶ 82.

Corephotonics itself has previously acknowledged that "telephoto" means TTL/EFL<1.0 (that is, TTL is smaller than EFL). For example, Corephotonics's original claim construction brief in this Court stated that where TTL is smaller than EFL, "[t]his provides a telephoto lens assembly":

> detail. All claims of the Asserted Patents require that the TTL be smaller than the EFL, *i.e.*, that the TTL to EFL ratio be smaller than 1.0. This provides a telephoto lens assembly that can be

Dkt. 96 at 2 (discussing a subset of asserted patents). Corephotonics also acknowledges this meaning elsewhere in its patent portfolio. Corephotonics patents that share named inventors with the '291 patent describe "***the telephoto condition (i.e. TTL<EFL)***," reiterating the meaning that "***for telephoto lens TTL<EFL***." Ex. F , 3:7-20. *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1200 (Fed. Cir. 2013) ("In a specification, a patentee's use of '*i.e.*' signals an intent to define the word to which it refers.") (cleaned up) (citations omitted).

While laypersons may sometimes use "telephoto" to refer to a lens with a narrow FOV and a long focal length, that is not the meaning a POSITA in the field of the patent would have understood when reading the claims, as textbooks explain.[3] Durand Decl., ¶ 85. The PTAB confirmed the same, and rejected Corephotonics's argument that the "Tele" lens may have an EFL/TTL greater than 1, in an IPR on a related patent with the same specification as the '291 patent:

> [R]egarding how the '942 specification uses the term, Patent Owner does not explain sufficiently what other embodiments purportedly exist in the '942 specification where a tele lens does not have an EFL/TTL less than one. Further, we do not agree that the specification defines a tele lens as being broader than an EFL/TTL less than one. Patent Owner has provided no example of such a definition in the specification. . . . [W]e find that the POSITA would have used the definitions that Smith and Kingslake indicate are accurate (or more precise) . . .

Ex. G at 69-70. There is no basis for a different result here. The PTAB's decision is relevant persuasive authority.[4] Should the Court desire to offer further construction more accessible to a lay juror, Apple has provided alternative proposals defining "wide-angle" and "telephoto" as EFL shorter

[3] Ex. H (Smith, Camera Lenses 2006) at 59 ("Contrary to much popular usage, a telephoto lens is ***not*** merely a lens having a relatively long focal length and narrow field of view. ***A true telephoto lens*** has negative power in its rear section to create a more compact and convenient system whose ***physical length is shorter than its EFL***."), Ex. C (Kingslake) at 8-9 ("Some *narrow-angle* lenses are loosely called 'telephoto' lenses because they have a longer focal length than the normal lens and thus give a picture to a larger scale. However, ***the name 'telephoto' should be restricted to a lens*** of a particularly compact type of construction (see page 148), ***in which the distance from the front of the lens to the film plane [TTL] is less than the focal length [EFL] of the lens***.")

[4] "District courts generally give deference to PTAB *inter partes* review decisions based on the PTAB's specialized patent knowledge and expertise." *TMC Fuel Injection Sys., LLC v. Ford Motor Co.*, No. 12-4971, 2016 WL 7155793, at *3 (E.D. Pa. Apr. 20, 2016) (citations omitted), *aff'd*, 682 F. App'x 895, 900 (Fed. Cir. 2017); *Clearlamp, LLC v. LKQ Corp.*, No. 12 C 2533, 2016 WL 4734389, at *6 (N.D. Ill. Mar. 18, 2016) ("The PTAB's decision is persuasive because it affords this court an opportunity to consider the PTAB's expert reasoning based on the evidence presented to it.") (citation omitted).

and longer than normal, respectively, and FOV wider and narrower than normal, respectively. Cameras are understood to have a "normal" EFL and FOV roughly matching human vision with the naked eye, and "wide-angle" and "telephoto" straddle opposite sides of the "normal." Durand Decl., ¶¶ 49, 85-89; Ex. AE at 42; Ex. H at 163; Ex. C at 8-9, 49; Ex. I at 8-15.

3. Corephotonics's proposed constructions are incorrect.

Corephotonics's proposals that "Wide" and "Tele" refer only to relatively broader or narrower FOV is contrary to the claim language, because the claims already expressly recite "Tele FOV that is narrower than the Wide FOV." '291, claims 1, 12. Corephotonics's proposal wrongly "renders claim language meaningless" and "superfluous." *In re Power Integrations, Inc.*, 884 F.3d 1370, 1376 (Fed. Cir. 2018). "Wide" and "Tele" must mean something different from the already-recited relative FOV.

Corephotonics's reliance on Claim 6 is unavailing. Claim 6 cannot broaden the claim scope because "claim differentiation . . . cannot enlarge the meaning of a claim beyond that which is supported by the patent documents." *Fenner Invs., Ltd. v. Cellco P'ship*, 778 F.3d 1320, 1327 (Fed. Cir. 2015). Open. Br. at 8. As the PTAB correctly ruled, the specification does not disclose a "Tele" lens whose TTL/EFL ratio is 1.0 or more. *See also Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1360 (Fed. Cir. 2016) ("The dependent claim tail cannot wag the independent claim dog.") (citation omitted); *Howmedica Osteonics Corp. v. Zimmer, Inc.*, 822 F.3d 1312, 1323 (Fed. Cir. 2016) (claim differentiation is merely "a guide"). Durand Decl., ¶ 83.

The Scarff reference to which Corephotonics points is irrelevant because the '291 patent does not refer to Scarff's disclosure of narrower and wider FOVs as "Wide" and "Tele." Open. Br. at 5; '291, col. 2:29-42. Durand Decl., ¶¶ 73-74.

B. "Fused/fusion" and "fused output image" / "without fusion . . . output images" ('291 patent, claims 1, 12)

Term	Corephotonics's Proposal	Apple's Proposal
"fused"	N/A	formed into a composite that includes pixels from the Wide and Tele images.
"fusion"	N/A	forming a composite that includes pixels from the Wide and Tele images.
"fused output image"	output image including a combination of image information from two images.	a composite output image that includes pixels from the Wide and Tele images.

"without fusion . . . output images"	output images not created by combining image information from two images.	output images that do not include a composite image that includes pixels from the Wide and Tele images.

The parties' dispute is whether the claimed "fusion" requires combining a particular kind of information, "pixels from the Wide and Tele images," as Apple proposes, or merely any arbitrary "information," as Corephotonics proposes.

1. The claimed "fusion" requires including pixels from both images.

The terms "fused" and "fusion" are well understood in the field of photographic imaging as combining pixels from two images. In other words, pixel values from both images are included in the output image. Durand Decl., ¶ 92. The '291 patent uses "fusion" consistent with this well understood meaning as forming a composite that includes pixels from Wide and Tele images.

a. The specification supports Apple's construction.

The patent specifically identifies the meaning of "fusion" based on a process described in the Border reference. Summarizing Border's disclosure, the '291 patent states: "Each sensor provides a separate image, referred to respectively as 'Wide' (or 'W') and 'Tele' (or 'T') images. . . . The images are then ***stitched (fused) together*** to form a ***composite ('fused') image***." '291, col. 2:4-24. Border uses the term "stitching" to describe combining Wide and Tele image pixels into a "composite" image. Border itself does not use the term "fused." The '291 patent embraces Border's process and expressly describes it as "fusion." *Id.* Durand Decl., ¶¶ 93-96. In particular, Border describes that "stitching" "uses ***pixel data from the telephoto image*** 206 for those portions . . . that are in the view of the telephoto image 206 and ***uses pixel data from the***

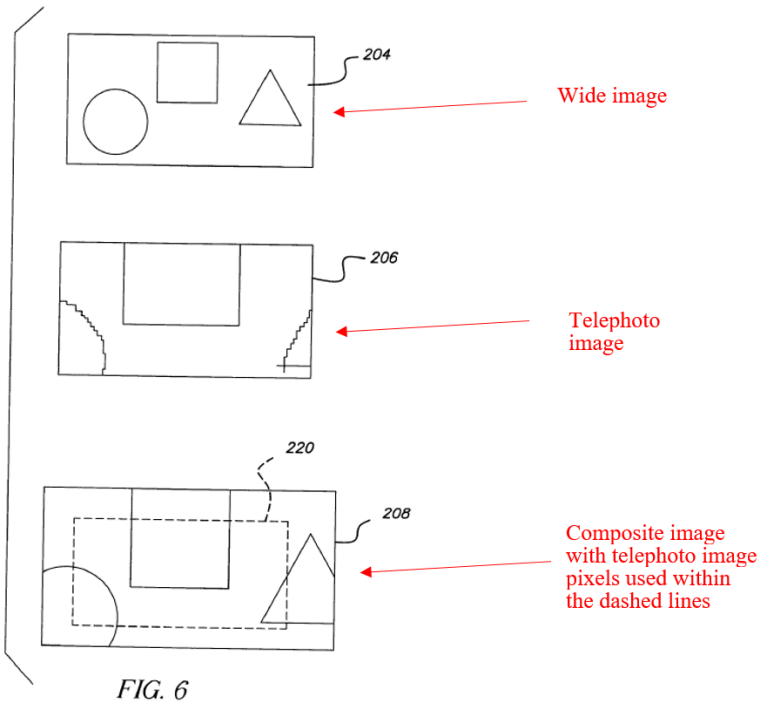


FIG. 6

wide image 204 otherwise." Ex. B at ¶ 47, Fig. 6, Fig. 5, ¶¶ 21, 43. Durand Decl., ¶ 96. Figure 6 of Border, reproduced here with annotations, shows the stitching of pixels from the wide image 204 in the outer portion of composite image 208 and pixels from the telephoto image 206 in the center portion of composite image 208. The '291 patent thus uses "fused" in its commonly understood sense to describe the process from Border where pixels from Wide and Tele images are "stitched (fused) together to form a composite ('fused') image." '291, col. 2:11-16. Contrary to Corephotonics's argument (Open. Br. at 13), the word "composite" is the word that Corephotonics itself chose as synonymous with fusion: "***a composite ('fused') image***." '291, col. 2:4-24; Durand Decl., ¶ 101.

The rest of the '291 specification consistently describes "fusion" as a process of forming a composite that includes pixels from both the Wide and Tele images. The patent distinguishes its invention from the Border and Scarff prior art on the basis that they do not "refer to ***partial fusion, i.e., fusion of less than all the pixels of both Wide and Tele images*** in still mode." '291, col. 2:53-56.[5] *SkinMedica*, 727 F.3d at 1200 ("patentee's use of '*i.e.*' signals an intent to define the word to which it refers"). With the definitive signifier "*i.e.*," the patent reconfirms that "fusion" means forming a composite of pixels from both the Wide and Tele images, and the prior art fails to teach "partial" fusion of less than all pixels from both. Durand Decl., ¶ 97. The "Summary of the Invention" section, which describes features required by all "[e]mbodiments disclosed herein," further describes "full" and "partial" fusion with the same meanings: "In still mode, zoom is achieved 'with fusion' (full or partial), by fusing W and T images, with the resulting fused image including always information from both W and T images. Partial fusion may be achieved by not using fusion in image areas where the Tele image is not focused." '291, col. 3:34-40. Thus, partial fusion can be achieved by not using pixels from unfocused area of the Tele image in combination with Wide pixels. Durand Decl., ¶ 98.

The description of "Wide fusion" and "Tele fusion" in the '291 patent further confirms that "fusion" requires inclusion of pixels from both the Wide and Tele images:

> In ***fused*** images, it is possible to register Tele image ***pixels*** to a matching ***pixel set*** within the Wide image ***pixels***, in which case the

[5] While the '291 patent refers to "US 2008/000592" ('291, col. 2:53-54), it is clear from context that this is a typographical error and should have referred to US 2008/0030592 (Border). U.S. 2008/0000592 is an irrelevant application entitled "Cord-winding device for a window blind."

> output image will retain the Wide POV ("Wide fusion"). Alternatively, it is possible to register Wide image ***pixels*** to a matching ***pixel*** set within the Tele image ***pixels***, in which case the output image will retain the Tele POV ("Tele fusion").

'291, 5:5-11. Thus, the registration (as shown in Step 506 of Figure 5), can match Tele image pixels to Wide image pixels ("Wide fusion"), or match Wide image pixels to Tele image pixels ("Tele fusion"). Again, fusion involves matching ***pixels*** between the Wide and Tele images, which are then combined into a composite. Durand Decl., ¶ 100.

b. Before the Patent Office, Corephotonics disavowed the construction it proposes here and argued for the meaning Apple proposes here.

During IPR of related U.S. Patent 10,225,479, a continuation that shares the same specification as the '291 patent, Corephotonics disavowed any mere "combination" of information as being "fusion." As here, those claims all required fusion of "Wide and Tele images to create a fused image." Corephotonics emphatically argued that fusion requires the inclusion of "pixels" into the composite image and distinguished prior art (Parulski) on that basis:

> Both of the challenged independent claims require processing the "Wide and Tele images to create a fused image." However, Parulski does not teach, or render obvious, the creation of a "fused image." . . . ***The use of one image to 'enhance' or 'focus' another does not teach 'fusing' two images*** as claimed by the '479 patent. *See* Ex.1001 at 2:25-26 ("***The images are then stitched (fused) together to form a composite ("fused") image****."); id*. at 3:47-52 ("In still mode, zoom is achieved 'with fusion' (full or partial), by fusing W and T images, with the resulting fused image including always information from both W and T images." (emphasis added)) . . . . ***Parulski does not teach that any pixels from the second image are included, or fused, in the first image.***

Ex. J at 6, 8. "[B]y distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover [and] by implication surrendering such protection." *Seachange Int'l, Inc. v. C-Cor, Inc.*, 413 F.3d 1361, 1373 (Fed. Cir. 2005) (citation omitted).[6] Here, Corephotonics, citing the same specification teachings that Apple now cites, argued that "fusion": (1) requires that

[6] These statements apply equally to the same recitation of "fused" / "fusion" in the parent '291 with the same written description. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1343 (Fed. Cir. 2015) ("A statement made during prosecution of related patents may be properly considered in construing a term common to those patents, regardless of whether the statement pre- or post-dates the issuance of the particular patent at issue.") (citation omitted); *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1306 (Fed. Cir. 2007) ("a statement made by the patentee during prosecution history of a patent in the same family as the patent-in-suit can operate as a disclaimer").

"pixels from the second image are included, or fused, in the first image," the same meaning Apple proposes here; and (2) excludes "[t]he use of one image to 'enhance' or 'focus' another," thereby disavowing the scope that Corephotonics proposes here. *Id.* Corephotonics's statements in the IPR are prosecution history intrinsic evidence that support Apple's construction and negate Corephotonics's position that a "fused image" covers any combination of any image information for any purpose. *Aylus*, 856 F.3d at 1359-64; *Iridescent Networks*, 933 F.3d at 1352.

Corephotonics's other IPR statements further undermine its current litigation-driven construction and support Apple's proposed construction. Corephotonics unequivocally proclaimed that "***[a] 'fused' image includes information from both the wide and tele images***" (Ex. K at 6), contradicting its current argument that "fusion" should not be defined using "Wide" and "Tele." Open. Br. at 13-14. Corephotonics also confirmed the narrow claim scope by distinguishing Parulski's disclosures as not teaching fusion. *E.g.*, Ex. K at 27 (arguing an embodiment that used information regarding focus position from one subcamera to set focus on the other "do not fuse data from two different images."); *id*. at 27 (distinguishing a passage of Parulski, stating it "***does not describe a 'fused image,'*** because sharpening using a range map would involve sharpening the edges [already] present in specific portions of the primary still image, ***rather than transferring image data from the secondary still image into the output image***."); *id*. at 27 (distinguishing another Parulski passage with "nothing in the passage describes ***combining portions*** of the wide and tele images"); *see also* Durand Decl., ¶¶ 125-147 (explaining uses of information from two cameras in Parulski distinguished by Corephotonics and agreeing these are not fusion, including use of focus information, ¶¶ 130-135; using a range map, ¶¶ 136-138; sharpening using an enhancement signal, ¶¶ 139-140; an embodiment describing use of a range map, ¶¶ 141-145). Corephotonics's arguments reconfirm that "fusion" requires combining "***portions***" of both images themselves, not merely combining any image-related "information" as Corephotonics now incorrectly suggests. *See also id*. at 25-26 (arguing that fusion requires "***directly incorporating image data***" from the other image).

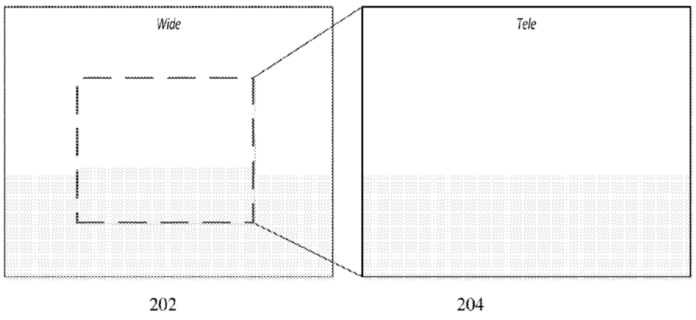
Corephotonics's expert in that IPR was the same Dr. Hart whose declaration Corephotonics submits here. In the IPR, Dr. Hart admitted that "fusion" requires including "pixel values" from both the Wide and Tele images, contradicting his opinions here. Ex. M, 95:18-24 (Q: Well, ***will the fusion***

image contain pixel values from both the Wide and the Tele image? A: ***Yes.*** It will use pixel values in the determination of the – it will – it will ***– it will look at the pixel values from both images in determining the pixel values of the output image***."); *see also id.*, 88:14-90:17. He further opined that Parulski did not disclose fusion because it did not disclose "***combining portions of the wide and tele images***" or "***directly incorporating image data from the tele image***" (Ex. L ¶¶ 74-75), again contradicting his current opinions that "fusion" does not require combining portions of Wide and Tele images (*e.g.*, Hart Decl., ¶¶ 45-48, 54). The Court may disregard Dr. Hart's unreliable declaration.

2. Corephotonics's arguments against Apple's construction are meritless.

First, Corephotonics's arguments against Apple's construction rely on an overly narrow misreading of Apple's construction to require exact unmodified pixels from Wide and Tele images to be pasted into the composite output image. Apple's proposal does not require this. Rather, in Apple's proposal, the composite must be created so as to "include" pixels from both images. Durand Decl., ¶¶ 102-104, 112-113, 118-119. Apple's usage is simply that which Corephotonics itself argued to the Patent Office: "pixels from the second image are included, or fused, in the first image." Ex. J at 8.

Corephotonics incorrectly contends that Apple's construction would "exclude" the "Figure 5 embodiment," but Corephotonics misstates that embodiment. Figure 5, the only embodiment showing the use of "fusion" in the '291 patent, requires forming a composite that includes pixels from the Wide and Tele images. Open. Br. at 12-13. For reference, Figure 2, on the right, illustrates overlapping Wide and Tele image areas, much like the overlapping images from Border Figure 6. The field of view of the Tele encompasses only the area within the dashed lines of the Wide. Figure 5 is a flow diagram of Figure 5 that depicts steps to perform fusion on "Wide and Tele images." '291, col. 9:15-36, Fig. 5. Durand Decl., ¶ 99. Steps 504 and 506, respectively, align and register the images (*i.e.*, find where pixels in one image appear in other). Durand Decl., ¶ 99. Step 508 then resamples the Tele image so that it has only the number of pixels in the overlap area of the Wide image that it will replace. The process checks in step 510 if an error has occurred, then fuses the images in step 512. *Id.*



Corephotonics misrepresents the Figure 5 embodiment in two ways. Open. Br. at 12-13. First, it applies misleading textual emphasis to the statement "[i]n this case, the Wide pixel values are used in the output image" (*id.* at 12), which is actually describing an error function, not fusion. That statement describes Step 510, which compares resampled Tele pixels with Wide image pixels within the overlap area, and if there are "significant dissimilarities," the process assumes an "error" and uses Wide image pixels. '291, 9:27-34, Fig. 5 (step 510). Thus, only if "an error is indicated" when comparing the Wide and Tele pixels then "[i]n this case, the Wide pixel values" are used in the output image—in which case there is no fusion. '291, col. 9:27-36; Durand Decl., ¶¶ 107, 124. Where there is no error, Step 512 is the "fusion step," and in that step, the resampled Tele image pixel values are composited with the Wide pixel values, creating a "fused zoom image." *See id*. In addition, Corephotonics misstates the disclosure by arguing that because the fusion in Step 512 uses "resampled" Tele pixels rather than original Tele pixel values, it falls outside Apple's construction. Not so. The resampled Tele data includes the Tele data, and therefore, contrary to Corephotonics's misinterpretation of Apple's proposed construction, the only disclosed fusion process in the patent does indeed include pixels from the Tele and Wide images. '291, col. 9:27-36. Durand Decl., ¶ 107.

Corephotonics's arguments regarding prior art references discussed in the '291 patent background (Golan and Shabtay '383) similarly misinterpret Apple's construction. Both references disclose combining pixels from two images to form a fused image and therefore fall within Apple's construction. Durand Decl., ¶ 112-121. In both Golan and Shabtay '383, two subcameras capture images of a scene. *Id*., ¶¶ 114, 120; Golan ¶ 65 (Wide FOV and Narrow FOV cameras); Shabtay '383 (substantially the same field of view cameras). In both references, one subcamera captures a color image by using a color image sensor, and the other subcamera captures a grayscale image using a monochrome image sensor. Durand Decl., ¶¶ 114, 120. As is well known to a POSITA, the grayscale image includes only luminance values, while the color image includes color information as well. *Id*., ¶¶ 39-41. Both references combine the color and grayscale pixel values from the two images to achieve a single higher resolution image.[7] Both Golan and Shabtay '383 include the pixels of the color

[7] *Id*., *citing e.g.*, Golan ¶¶ 64-65 ("The fusion includes computing color values for the high resolution pixels of monochrome image frame 630 from the respective low resolution color image

and monochrome images in a composite by including per-pixel data from both images, and therefore are within Apple's construction of fusion. Durand Decl., ¶¶ 115-116, 120-121. Nothing in Apple's construction requires that the composite must have *unchanged* pixels from the Wide and Tele, only that the pixels must be *included* in creating the composite image.

Second, Corephotonics objects to the inclusion of "Tele" and "Wide" in Apple's construction. Open. Br. at 13-14. But Corephotonics itself repeatedly stated that "fusion" combines from both the Wide and Tele images. Ex. K at 6 ("[a] 'fused' image includes information from both the wide and tele images"), '291, col. 3:34-40 ("the resulting ***fused*** image including ***always*** information from ***both*** W and T images"); Durand Decl., ¶ 109. Apple's construction also properly defines "fusion" in the context of the '291 specification and claim language, which recites a function to "combine . . . Wide and Tele image data to provide a fused output image." '291, claims 1, 12. In context, "fused" means forming a composite that includes pixels from both Wide and Tele images. The insertion of Apple's constructions into the claims, as shown on page 14 of Corephotonics's brief, provides a perfectly accurate and correct statement of the proper claim scope. Open. Br. at 14.

Third, Corephotonics's brief incorrectly asserts, without support, that Apple "admitted" some broader meaning in IPR. *Id*. at 14. In fact, Apple's '291 patent IPR petition merely noted that "a fused output image" would "at least include" an output image including information from two images, but the precise definition of "fusion" was not a disputed issue in that context as Apple mapped the "fusion" limitation to combining pixels in the prior art. Durand Decl. ¶ 111. In any event, Apple is not the patent owner who can disclaim and narrow the scope of its patent claims by making arguments to the Patent Office, as Corephotonics did here.

3. Corephotonics's proposed construction is meritless.

Corephotonics's overbroad construction—which would broadly encompass combining any image "information" from the two imaging sections—is incorrect. Durand Decl. ¶ 122. It ignores the

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frame 632."), ¶ 68 (converting the image from the color sensor from RGB to YCrCb, then "fusion module 760 merges the Y information from, obtained from monochrome image sensor 610, and the color (Cr, Cb) information."); Shabtay '383, 9:19-23 ("dual-aperture camera having a clear sensor and a color sensor as disclosed herein leads to an overall increase in effective resolution because of the ability of the clear sensor to resolve higher spatial frequencies of the luminance component of the scene, compared with a color sensor."), Fig. 4 ("R, G, B values at each image pixel").

specification's detailed teachings. It also ignores Corephotonics's proclamations to the Patent Office. For example, Corephotonics's construction would cover the combination of image-related information from one image to enhance another image, but Corephotonics unequivocally disclaimed that "***[t]he use of one image to 'enhance' or 'focus' another does not teach 'fusing' two images***." Ex. J at 8.

Corephotonics hinges its construction on a misreading of the word "information" in a single sentence from the '291 patent. Open. Br. at 11-12. That sentence states: "In still mode, zoom is achieved 'with fusion' (full or partial), by fusing W and T images, with the resulting fused image including always information from both W and T images." '291, col. 3:34-38. Considering the entirety of the specification, however, this sentence is teaching that in Corephotonics's invention, the "resulting fused image" is "always" a composite of information from "both" the Wide and Tele images. Durand Decl., ¶ 123; *see also id*. (confirming the detailed description of the use of fusion during zoom confirms that the output is always a Wide fusion or Tele fusion output). The reference to "information from" the "images" here cannot be understood to mean any arbitrary "information" as Corephotonics incorrectly contends. In context, it refers to pixel data, as the specification repeatedly describes elsewhere ('291, col. 2:4-24, 2:53-54, 5:5-11, 9:15-36) and as Corephotonics told the Patent Office. Corephotonics points to no embodiment in which any information other than pixel data is "fused," and no example where a POSITA uses the term "fusion" in the context of fusing images in digital photography to mean combining anything other than pixel data. Durand Decl., ¶ 105-106.

Finally, the '291 patent contradicts Corephotonics's overbroad construction, as it describes using non-pixel information from one image in another image as "***without*** fusion." The patent explains that in video mode, rather than fusing two images, the camera switches "without fusion" between Wide and Tele, using the Tele when the user zooms in more (higher zoom factor ("ZF") and using the Wide when the user zooms out (lower ZF). '291, 3:41-43, 4:43-48. To provide a smooth transition between the Wide and Tele, when using the Tele camera, the camera may use "secondary information" from the Wide, and when using the Wide camera, may use the "secondary information" from the Tele. *Id*., 4:52-59, claim 11. The patent defines "secondary information" as "white balance gain, exposure time, analog gain, and color correction matrix." *Id*., 4:58-59. These are all "information" from the imaging sections and use of these in generating an output image is "without fusion." *See* Durand

Decl., ¶¶ 166-167. Yet, these would fall within Corephotonics's incorrect construction of "fusion" broadly covering combining any information from two imaging sections.

C. "fused output image of the object or scene from a particular point of view" ('291 patent, claims 1, 12)

Corephotonics's Proposal	Apple's Proposal
"a fused output image of an object or scene from a particular point of view" means "a composite / output image that if from the Wide POV combines Wide image data with image data from the overlap region of the Tele image, and if from the Tele POV, combines Tele image data with image data from the overlap region of the Wide image" "output image of the object or scene from a particular point of view" means that "the object and scenes of the output image have the position and shape as would be seen from a defined point of view of one of the Wide or Tele lens"	"A fused output image of an object or scene from a particular point of view" means an output image of an object or scene that is always a composite of both Wide and Tele image pixels, whether from the Wide or Tele point of view. The sub-phrase "output image of the object or scene from a particular point of view" requires no separate construction. If the Court determines that construction is necessary, "output image of the object or scene from a particular point of view" means an output image of the object or scene from the Wide or Tele point of view.

Apple's construction for the complete phrase, "a fused output image . . .," properly reflects the meaning of "fused" as explained above: always a composite of Wide and Tele image pixels. Beyond that "fusion" limitation, no construction is needed. Corephotonics seeks to import narrowing verbiage defining "from a particular point of view," but fails to show why its construction is required. Open. Br. at 15. These are plain English words used according to their ordinary meanings. In context, the claims contemplate two different points of view: the Wide point of view or the Tele point of view. '291 claims 1 and 12 ("Wide" and "Tele"). Corephotonics agrees, in its proposed constructions, that "Wide POV" and "Tele POV" are the two applicable points of view in these claims. If construction were needed, Apple's construction captures the applicable meaning of ". . . from a particular point of view" in the context of these claims: from the Wide or Tele point of view.

Corephotonics erroneously contends that the specification contains a narrower "definition [of] point of view (POV)." Open. Br. at 15. Not so. The specification does not provide any such definition. The specification merely discusses the fact that when a given object is seen from two different sub-cameras the object will appear differently, which "is referred to as point-of-view (POV)." '291, col.

4:60-63. This is not a lexicographic definition of the term "point of view." The fact that objects appear differently from different points of view is merely an *observed effect* of having different points of view, not a *definition* of "point of view." Furthermore, Corephotonics seeks to import a narrowing "position ***and*** shape" requirement, but its cited passage of the specification provides only open-ended, non-limiting proclamations that the "output image ***can*** have the shape and position of either sub-camera image ***or*** the shape ***or*** position of a combination thereof." *Id*., col. 4:60-5:2.

Finally, Corephotonics itself does not even define "point of view" in its constructions. Its constructions merely repeat the claim language "point of view" (POV) without defining that term.

D. "image data" ('291 patent, claims 1, 12)

Corephotonics's Proposal	Apple's Proposal
plain and ordinary meaning, or, in the alternative if the Court determines a construction is necessary, "data output from an imaging section"	data that represents image pixels.

The '291 patent claims "image data" in the context of a "digital camera" and image sensors that use "pixels" to capture an image. The patent teaches the use of conventional "pixelated sensor" components for the wide-angle and telephoto sub-cameras that generate pixels constituting image data, resulting in "Tele image pixels" and "Wide image pixels." *Id*., col. 1:46-47, 1:53-58, 3:32-35, 3:57-58, 5:5-11. The patent assumes pixelated sensors as a basic foundation for the claimed invention, necessary to generate the "image pixels," and suggests variations only in optional ways of configuring the pixelated sensors. *E.g.*, *id*., col. 3:32-35 ("The image sensor may include two separate 2D pixelated sensors or a single pixelated sensor divided into at least two areas."), *Id*.,6:9-10 ("The Wide sensor pixel size can be equal to or different from the Tele sensor pixel size."). Durand Decl., ¶ 154-155; see also ¶¶ 36-43 (explaining background regarding pixels in image sensors).

Building on that foundation, when describing the "image" or "digital image data" output from a "pixelated image sensor," the patent explicitly defines that "***'image,' 'image data,' and 'digital image data' may be used interchangeably***." '291, col. 1:53-67. The "image" output from the "pixelated image sensor"—the data representing image pixels—is the "image data." *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1363 (Fed. Cir. 2016) ("The specification is *always* highly relevant to the claim construction analysis and is, in fact the single best guide to the meaning of a

disputed term.") (emphasis in original, cleaned up, citation omitted). Durand Decl., ¶¶ 154-155. Apple's proposal does not "narrow" or "exclude" anything the patent discloses. *Cf.* Open. Br. at 18.

The claim language is consistent with the specification teachings. Dependent claims 5 and 14 refer to the "pixels" of the Wide sensor, consistent with claims 1 and 12 involving a pixelated image sensor that outputs "image data" that represents those pixels. '291, claims 5, 14.

Corephotonics's construction of "data output from an imaging section" is erroneously overbroad as it would encompass any non-image data that an "imaging section" might output, such as time/date data, electromechanical settings such as the focus position of the camera, and other "data" that a POSITA would not understand to be "image data" in context. Durand Decl., ¶¶ 165-167. "[T]he claims cannot be of broader scope than the invention that is set forth in the specification." *Gemalto S.A. v. HTC Corp.*, 754 F.3d 1364, 1369 (Fed. Cir. 2014) (citation omitted).

Corephotonics alleges that Apple's construction would exclude "luminance" and "intensity" information that does not represent specific pixels. Open Br. at 17-18 (citing the Dagher reference which mentions "luminosity (i.e., luminance) channel and intensity information"). However, luminance and intensity information are, in fact, represented as pixel data. Durand Decl., ¶ 156. For example, Dagher confirms that luminance "image data" represents image pixels. The portion Corephotonics cites describes a "grayscale camera" where there are no RGB color values, only luminance, but Corephotonics's quotation omitted a key sentence: "Arranging of the second sub-camera may include supplying the second sub-camera as a ***grayscale camera for providing the luminance channel as being composed of grayscale scaled image data***." Dagher, ¶ 9. In other words, the "luminance channel" represents the image pixel values for a grayscale camera where there are no color values. Durand Decl., ¶¶ 44-45. Corephotonics plucks out of context and truncates its cited paragraphs from Dagher, and then erroneously asserts that Dagher would not fit within Apple's construction because "luminosity" is information other than the "individual RGB values in an array of pixels." Open. Br. at 17-18. But Apple's proposal has no requirement that the pixels are RGB values. In context, Dagher describes combining luminance pixels from a grayscale camera with color pixels from a color camera (like Golan and Shabtay). Ex. AG at ¶¶ 63, 0100. Durand Decl., ¶¶ 157-159.

The '291 patent also never refers to "intensity information" as "image data." Open. Br. at 17. However, both luminance and intensity information are represented in a digital camera image as pixel data. Durand Decl., ¶¶ 39, 42-44. Apple's construction therefore includes luminance or intensity information that represent image pixels in a color camera. *Id.*, ¶¶ 155-156. In the case of a grayscale camera, the intensity of the luminance represents the pixels and would be sufficient. *Id.*

Computer-generated "vector" graphics are irrelevant to this digital camera patent. *Cf.* Open. Br. at 18. Durand Decl., ¶ 164. Corephotonics's expert admits, as he must, that this patent is in the field of "photographic imaging systems." Hart Decl., ¶ 11. Using Corephotonics's flawed reasoning, numbers in a paper paint-by-numbers workbook is also "image data," but that is not the "image data" this patent contemplates. "The terms used in patent claims are not construed in the abstract, but in the context in which the term was presented and used by the patentee." *Fenner*, 778 F.3d at 1322-23 (citation omitted). This term needs to be construed (*O2 Micro*) with the meaning supplied by the specification.

E. "lens assembly" ('712 patent, claims 1, 12, 13, 15, 16, 19)

Corephotonics's Proposal	Apple's Proposal
"Plain and ordinary meaning, or, in the alternative if the Court determines that a construction is necessary, "arrangement of optical lens elements"	a five lens element optical lens assembly. Alternatively, "lens assembly" means "a self-contained operational unit of five optical lens elements," or alternatively "a lens limited to five elements."

The '712 patent teaches that its "lens assembly" is limited to five lens elements. The Background section first criticizes existing lens assemblies with four lens elements: "***Conventional lens assemblies comprising four lens elements are no longer sufficient for good quality imaging*** in [cellphone] devices. '712, col. 1:32-34. The patent notes that while five-element lens elements were known in the prior art, "***a need exists in the art for a five lens element optical lens assembly***" with a small TTL/EFL ratio. *Id.*, col. 1:34-41. This is the only stated need or problem that the patent purports to solve. The only way the claimed invention could possibly address this stated need is to provide a "five lens element" optical lens assembly that satisfies the stated criteria. By criticizing four-element lens assemblies as "no longer sufficient," and addressing a need for a "five lens element" lens

assembly, the patent disavows lens assemblies that are not limited to five lens elements. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016) ("an inventor may disavow claims lacking a particular feature when the specification distinguishes or disparages prior art based on the absence of that feature") (citations omitted). Where, as here, the patent "has manifested that the invention does or does not include a particular aspect, that intention 'is regarded as dispositive.'" *Techtronic Indus. Co. Ltd. v. Int'l Trade Comm'n*, 944 F.3d 901, 907 (Fed. Cir. 2019) (citation omitted). The Abstract confirms that the purported invention is an optical lens assembly that includes five lens elements: "***An optical lens assembly includes five lens elements*** and provides a TTL/EFL<1.0." *Id*., Abstract. The Abstract follows this unqualified description of the purported invention—the "lens assembly includes five lens elements"—with the description that "an embodiment" "may" have certain dimensions among the five lens elements. *Id*. *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F. 3d 858, 864 (Fed. Cir. 2004) (construing claimed "plug" to be "pleated" where the Abstract "unequivocally defines the claimed plug as having pleats" by describing "[a]n implantable prosthesis including *a conical mesh plug having a pleated surface* . . ."") (emphasis in original). The claimed invention is limited "[w]here, as here, the specification plainly represents the scope of the invention to the exclusion of some embodiments." *Techtronic*, 944 F.3d at 909 (citation omitted). Tesar Decl., ¶¶ 51-54, 67-68.

The rest of the specification is consistent. Every lens assembly embodiment contains exactly five lens elements. '712, Figs. 1A, 2A, 3A, col. 2:58-3:12, 4:60-5:13, 6:9-30. "[T]he patentee's choice of preferred embodiments can shed light on the intended scope of the claims." *Trs. of Columbia*, 811 F.3d at 1364 (citation omitted). Tesar Decl., ¶¶ 55-56. The key point is the five-element limitation, but Apple's alternative proposal also reflects the meaning a POSITA would understand from the disclosures of a self-contained, operational lens assembly (sometimes just called a "lens"). *Id*., ¶¶ 57-58, 70. By contrast, Corephotonics's construction of "arrangement of optical lens elements" would erroneously cover any set of lens elements that is *not operational* to produce a focused image, or a mere subset of elements in an operational lens, which is not the meaning a POSITA would have understood. *Id*.

The parties' dispute is significant because Corephotonics accuses Apple lenses that have six lens elements.[8] *E.g.*, Ex. N at 5-6. The dispute is also important for another reason: invalidity. The '712 patent does not describe a lens assembly with more or less than five lens elements. The disclosed lens assemblies each have a specific configuration of five elements, purportedly allowing incoming light (from the left) to properly focus at the image plane (on the right). '712, Figs. 1A, 2A, 3A. The patent never contemplates removing or adding lens elements, which would materially change the optical physics and require a comprehensive redesign to obtain a functional lens, including meeting the required focal length and F#, and correcting for chromatic aberrations, field curvature, and distortion. Tesar Decl., ¶ 61. Corephotonics's expert does not appear to be a POSITA or expert in lens design and therefore did not accurately consider the knowledge of a POSITA. *Id*., ¶¶ 20-29. If "lens assembly" is not limited to a five-element lens assembly, then the '712 patent claims will be invalid under 35 U.S.C. § 112 for insufficient description.[9]

As discussed above, the specification describes only five-element lens assemblies and disparages four-element assemblies, so the fact that claim 1 recites only limitations for a subset of those elements (specifically, three) does not diminish the understanding that the whole "lens assembly" is a five-element one. Tesar Decl., ¶¶ 49, 65-66. The claims (including claim 1 and dependent claims 2 and 4) focus on elements and features inside that five-element assembly. *Id*.

Finally, this meaning is not changed by a bare, undiscussed citation of references in prosecution, which may well have been provided for undisclosed reasons unrelated to the meaning of "lens assembly." *Cf.* Open. Br. at 19. Tesar Decl., ¶ 64.

[8] *Exigent Tech., Inc. v. Atrana Sols., Inc.*, 442 F.3d 1301, 1309 n.10 (Fed. Cir. 2006) ("it is appropriate for a court to consider the accused device when determining what aspect of the claim should be construed") (citations omitted).

[9] *Synthes USA, LLC v. Spinal Kinetics, Inc.*, 734 F.3d 1332, 1341-45 (Fed. Cir. 2013) (claims invalid for lack of written description where specification narrowly described only "grooves" but "[t]he district court, at [patentee's]'s urging, broadly construed the phrase" to encompass all "openings"); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1380 (Fed. Cir. 2007) ("The irony of this situation is that [patentee] successfully pressed to have its claims include a jacketless system, but, having won that battle, it then had to show that such a claim was fully enabled, a challenge it could not meet. The motto, 'beware of what one asks for,' might be applicable here.").

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